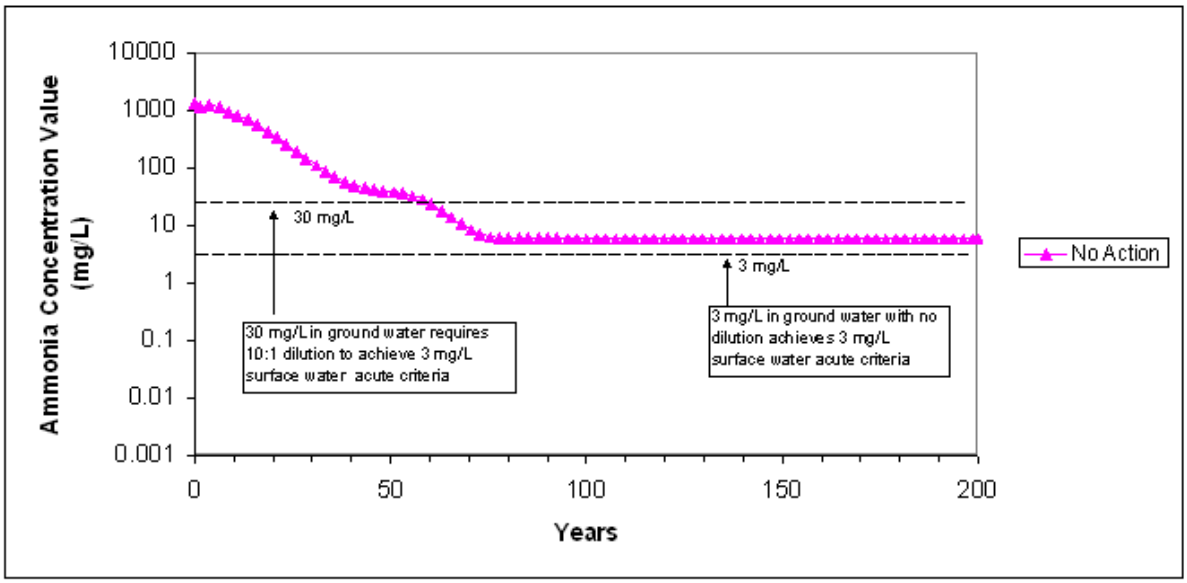


*Figure 2–44. Predicted Maximum Ammonia Concentrations in Ground Water for No Action*

### 2.3.3 Uncertainties

DOE does not have a quantitative estimate of uncertainty associated with modeling predictions estimating the time for ground water concentrations to reach target goals that are protective of aquatic species. The uncertainties can be grouped into the following general categories:

- Future changes in the status of threatened and endangered species.
- Future changes in AWQS.
- Uncertainties in concentrations predicted by the ground water model.
- Uncertainties in the time to achieve the target goal predicted by the ground water model.
- Change in concentrations of contaminants associated with ground water discharge to surface water (i.e., application of a dilution factor).

This analysis of uncertainties focuses on the goal of achieving concentrations of contaminants in the river that are protective of threatened and endangered fish species. According to the recovery plan for the Colorado pikeminnow (USF&WS 2002), downlisting could be achieved by 2006 and delisting by 2013. The razorback sucker could be delisted by as early as 2023 (USF&WS 2002). At that time, protection of threatened and endangered fish and critical habitat could have less significance, and less conservative remediation objectives could be applicable. Conversely, ambient water quality standards (federal or state) could be revised that affect target remediation goals.

Sections 7.3, 7.6, and 7.8 of the SOWP (DOE 2003b) discuss the sensitivity of the ground water flow and transport model to specific modeling input parameters as well as modeling uncertainty. Specifically, transport parameters (e.g., tailings seepage concentration and the natural degradation of ammonia in the subsurface) were found to have a much greater impact on predicted concentrations than did flow parameters (e.g., hydraulic conductivity and effective porosity). The sensitivity analysis performed indicates that perturbing the key transport

parameters from the calibrated values could result in either significantly higher or significantly lower contaminant concentrations in the ground water adjacent to the river; it did not indicate the probability or likelihood of any one outcome.

The variables affecting prediction accuracy are many, and the system of contaminant transport and the interaction between ground water and surface are complex, largely due to the dynamic nature of river stage and backwater area morphology. To compensate for the inherent uncertainties, DOE has assumed a conservative protective water quality goal of meeting the lowest possible acute aquatic standard (based on the range of observed pH and temperature conditions in the river) in the ground water with no consideration of dilution.

On-Site Disposal

Model predictions, supported by the site-specific data, indicate that long-term ground water concentrations adjacent to the river (0.7 mg/L ammonia for the on-site disposal alternative) would be protective for acute and chronic exposure scenarios for all but the worst-case pH and temperature conditions without any consideration of dilution from the surface waters.

Because seepage from the tailings pile represents a long-term source of ground water loading, an on-site disposal decision could result in longer-term active ground water remediation; higher concentrations of residual ground water contamination also would be expected to remain at the conclusion of the remediation time period (see Figure 2–43). The longer operational time period would also result in a corresponding increase in operational costs of the system.

Some acceleration of cleanup could be realized under the on-site disposal alternative by focused ground water remediation of the legacy plume and the ammonia flux from the brine interface. However, after the legacy plume and ammonia flux from the brine interface were depleted, the continued presence of the tailings pile source would limit the degree to which concentrations could ultimately be reduced. Uncertainties associated with model predictions for the on-site disposal alternative involve both time required to meet steady-state conditions and the question of whether the target goals (i.e., concentrations) could be met.

Off-Site Disposal

Model predictions, supported by the site-specific data, indicate that long-term ground water concentrations adjacent to the river (background concentrations for the off-site disposal alternative) would be protective for acute and chronic exposure scenarios for all but the worst-case pH and temperature conditions without any consideration of dilution from the surface waters.

No Action Alternative

It is possible that the No Action alternative would meet the target goal considering the number of uncertainties involved. For example, a factor-of-2 decrease in the 6-mg/L ammonia concentration in ground water predicted at steady state would result in meeting the 3-mg/L target goal. A factor-of-2 decrease in predicted concentrations is within the lower range of uncertainty.

It is clear that if ground water concentrations comply with remediation objectives, surface water concentrations should comply as well. Therefore, on the basis of site-specific data and a study of

the site conditions, DOE has a reasonable degree of confidence that protective conditions would be met and maintained both during the operation of the remedial action (75 to 80 years) and following achievement of water quality goals. Monitoring would confirm performance to meet target concentrations.

## 2.4 No Action Alternative

Although DOE would not remediate contaminated materials or ground water under this alternative, DOE would likely complete tasks necessary to secure the site to minimize the potential for accidents. For example, power would be turned off and equipment would be removed. This alternative is analyzed to provide a basis for comparison to the action alternatives and is required by NEPA regulations (40 CFR 1502.14[d]).

Under the No Action alternative, DOE would not remediate on-site surface contamination, which includes the existing tailings pile, contaminated materials and buildings, and unconsolidated soils. The existing tailings pile with its interim cover would not be capped and managed in accordance with 40 CFR 192 standards; this consequence of the No Action alternative would conflict with the requirements of the Floyd D. Spence Act. In addition, no site controls or activities to protect human health or the environment would be continued or implemented. Public access to the site would be unrestricted. All site activities, including operation and maintenance activities, would cease. Vicinity properties located close to the site and near the town of Moab, including residences, commercial and industrial properties, and vacant land, would also not be remediated.

Initial and interim ground water actions would not be continued or implemented. DOE would abandon all ongoing and planned activities designed to protect endangered species and prevent discharge of contaminated ground water to the Colorado River. No further media sampling or characterization of the site would take place.

A compliance strategy for contaminated ground water beneath the site would not be developed in accordance with standards in 40 CFR 192. Contaminated ground water would discharge indefinitely to the backwater areas of the Colorado River, and ammonia concentrations would continue to exceed protective levels. No institutional controls would be implemented to restrict the use of ground water, and no long-term surveillance and maintenance would take place. Because no activities would be budgeted or scheduled at the site, no further initial, interim, or remedial action costs would be incurred.

## 2.5 Alternatives Considered But Not Analyzed

This section addresses on-site and off-site alternatives, including locations, that were initially considered on the basis of preliminary assessment. However, they were eliminated from detailed evaluation for this draft EIS.

### 2.5.1 On-Site Alternatives

On-site alternatives for surface remediation that were initially considered included (1) stabilize-in-place, (2) solidification, (3) soil washing, and (4) vitrification. All but stabilize-in-place were eliminated from detailed evaluation. The rationale for elimination is discussed below.